Remarks

I. Status of the Claims

Claims 1-20 and 33-54 are pending. Claims 33-43 are cancelled without prejudice.

Claims 1-20 and 44-54 stand rejected under 35 U.S.C. § 112, first and second paragraphs.

Claims 1-20 stand rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 5,968,745 to Thorp et al. (hereinafter "Thorp").

Applicants acknowledge with appreciation that no prior art rejections have been made to Claims 44-54.

II. 35 U.S.C. § 112, first and second paragraphs

Claims 1-20 and 33-54 stand rejected under 35 U.S.C. § 112, first and second paragraphs as being indefinite and for a lack of enablement. The Examiner has taken the position that the term "a chemically crosslinked material" is unclear given the scope of the claims encompassed by definitions (1) through (5). In response to Applicants' arguments submitted April 15, 2002, the Examiner states that the claim definitions of a "chemically crosslinked material" encompass diverse materials such as RNA and diamond and that it is not clear what type of "chemically crosslinked material" could be prepared solely from carbon and oxygen, carbon and nitrogen, or carbon and hydrogen. See paragraphs 6 and 10 of the Action. The Examiner has also taken the position that the specification is nonenabling because the scope of the claims encompass coating materials such as diamond and RNA, which would require undue experimentation to make and use.

Applicants respectfully disagree with the Examiner's apparent interpretation of the scope of the claims and the rejection based on nonenablement and indefiniteness. In order to simplify the issues, Claims 1, and 44-50 have been amended to recite an "amorphous chemically crosslinked material." Support for the amendment can be found on page 4, lines 10-11 of the specification.

A. The scope of the Claims

In paragraph 10 of the Action, the Examiner apparently interprets definitions (1) through (5) in the claims as a definition of a chemically crosslinked material. However, the term "chemically crosslinked material" is clearly a separate limitation in addition to the definitions. In other words, the claims as amended are generally directed to a coating material comprising an amorphous chemically crosslinked material further limited by the definitions labeled (1) through (5) and various combinations thereof. Because not every limitation in the claim has been considered, the Examiner's interpretation is an improper dissection of the claims. According to the M.P.E.P., "when evaluating the scope of a claim, every limitation in the claim must be considered. Office personnel may not dissect a claimed invention into discrete elements and then evaluate the elements in isolation. Instead, the claim as a whole must be considered. See, e.g., *Diamond v. Diehr*, 450 U.S. at 188-89, 209 USPQ at 9 ("In determining the eligibility of respondents' claimed process for patent protection under 101, their claims must be considered as a whole. It is inappropriate to dissect the claims into old and new elements and then to ignore the presence of the old elements in the analysis. This is particularly true in a process claim because a new combination of steps in a process may be patentable even though all the constituents of the combination were well known and in common use before the combination was made.")." M.P.E.P. § 2106.

Therefore, the claim language does not encompass diamond and RNA because diamond and RNA are not amorphous chemically crosslinked materials, and as such, do not satisfy all limitations of the claim. Such materials are not encompassed by the claim when every limitation is considered, as required by caselaw and the M.P.E.P.

However, it would be clear to those of skill in the art that amorphous chemically crosslinked materials may be formed solely from carbon and oxygen, carbon and nitrogen, or carbon and hydrogen using the deposition process described in the application. Examples of chemically crosslinked materials formed solely from carbon and oxygen, carbon and nitrogen, or carbon and hydrogen using the deposition processes described in the application include hydrogenated Diamond-Like Carbon (DLC) materials (from precursors such as CH_4, $C2H_6$ and the like) and amorphous carbon-nitrogen films (from precursors such as CH_4 and N_2).

B. Claims 1-20 and 44-54 are not indefinite.

Applicants contend that the term "non-adsorption of biomolecules" in Claims 1 and 44-50 is not vague and indefinite. Nonetheless, the term has been removed from the claims in order to simplify the issues.

In light of the above discussion of the scope of the claims and the removal of the term "non-adsorption of biomolecules" from the claims, Applicants submit that the claims satisfy 35 U.S.C. § 112, second paragraph requirements and request that such rejections be withdrawn.

C. Claims 1-20 and 44-54 are enabled.

The specification is enabling based on the scope of the claims discussed above considering each and every claim limitation.

The Examiner has posed several questions in paragraph 4 of the Action, which are repeated from the First Office Action mailed November 15, 2002, regarding how to make and use the invention. Applicants responded to such questions in the Response filed April 15, 2002, page 7, first full paragraph – page 8 and are unable to ascertain any deficiency in the response. If the Examiner requires further clarification, Applicants request that specific points of clarification be identified so the Applicants may provide a satisfactory response. The Examiner acknowledges that techniques for making coatings by depositing materials on a substrate are known in the art. Paragraph 11 of the Action. The Examiner states that the scope of the claims encompass such coating material as diamond and RNA, and that making and using such coatings would require undue experimentation. As discussed above, diamond and RNA do not satisfy all limitations of the claims.

However, assuming for the sake of argument that diamond and RNA were included by the definitions of coating compositions in the claims, such species would be inoperable. The presence of inoperative species in a claim does not render a claim nonenabled. See M.P.E.P. § 2164.08(b). ("The presence of inoperative embodiments within the scope of a claim does not necessarily render a claim nonenabled. The standard is whether a skilled person could determine which embodiments that were conceived, but not yet made, would be inoperative or operative with expenditure of no more effort than is normally required in the art.") Courts have noted that "many patented claims read on vast numbers of inoperative embodiments in the trivial sense

that they can and do omit 'factors which must be presumed to be within the level of ordinary skill in the art,' In re Skrivan, 166 U.S.P.Q. 85, 88 (1970), and therefore read on embodiments in which such factors may be included in such a manner as to make the embodiments inoperative. There is nothing wrong with this so long as it would be obvious to one of ordinary skill in the relevant art how to include those factors in such manner as to make the embodiment operative rather than inoperative." In re Cook and Merigold, 169 U.S.P.Q. 298, 302 (C.C.P.A. 1971)(emphasis in original). Furthermore, it is not a requirement of the claims or the specification to specifically exclude all inoperative species. Ex parte Janin, 209 U.S.P.Q. 761, 763 (P.O.B.A. 1979) (citing In re Dinh-Nguyen and Stenhagen, 181 U.S.P.Q. 46 (C.C.A.P. 1974) and quoting In re Geerdes, 180 U.S.P.Q. 789 (C.C.P.A. 1974)("Of course, it is possible to argue that process claims encompass inoperative embodiments on the premise of unrealistic or vague assumptions, but that is not a valid basis for rejection.")).

It would be obvious to those of skill in the art that embodiments such as RNA and carbon in the form of diamond would be inoperative, and the alleged inclusion of such materials by the claims would not render the claims nonenabled.

Accordingly, Applicants request that the rejection based on lack of enablement be withdrawn.

D. Claim 46

Claim 46 is enabled for the reasons discussed above. In addition, the Examiner has indicated that the specification provides an enabling written description for a substrate produced by the process of Example 1. The Examiner states that it is unclear how the "passivation layer" in Example 1 is related to the layers described by the claims. Paragraph 4 of the Action. The "passivation layer" simply refers to a coating composition.

Claim 46 recites an "amorphous chemically crosslinked material comprising Si, C, and H deposited in a PECVD process with a tetra methyl silane ($Si(CH_3)_4$) precursor " as specified by Example 1. Therefore, it appears that Claim 46 is enabled in accordance with the Examiner's position that the specification provides an enabling written description for a substrate produced by the process of Example 1.

II. Claim rejections under 35 U.S.C. § 102

Claims 1-20 stand rejected as being anticipated by Thorp. As an initial matter, it is noted that Thorp is completely inapplicable because a "functional group" represents a portion of a molecule (in this case, the substrate surface) while the oligonucleotides of Thorp are separate molecules (and hence, distinct elements for purposes of the instant claims). Terms in a claim must be given their plain meaning and read as they would be interpreted by those of ordinary skill in the art unless such terms are defined in the specification. See M.P.E.P. § 2111.01. The Examiner has taken the position that the definitions in the specification (page 4, lines 26-28 and page 5, lines 19-21) include the oligonucleotide of Thorp. However, the definitions are directed to defining different types of functional groups, specifically electrophilic and nucleophilic functional groups, and do not alter the common understanding of the term "functional group."

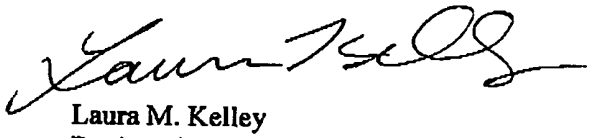
To narrow the issues, Claim 1 has been amended to recite that the electrophilic or nucleophilic functional group is "selected from the group consisting of hydrogen-terminations, alkyl groups, quarternary ammonium groups, carbon, silicon, halogens, oxygen, hydrogen, nitrogen, sulfur, and phosphorus." Support for this amendment is found at page 4, lines 26-31 and page 5, lines 18-24. In clear contrast, the oligonucleotide in Thorp must possess a sequence, at least a portion of which is complementary to a known portion of the sequence of the target nucleic acid. *See* Thorp, col. 8, lines 46-49. Thorp proposes an oligonucleotide probe that has between about 4 or 6 bases up to about 80 or 100 bases or more, preferably between about 8 and about 30 bases. *See* col. 7, line 65 – col. 8, line 2. Furthermore, the purpose of the oligonucleotide probe in Thorp is to detect a target nucleic acid through specific binding with the oligonucleotide probe. "Hydrogen-terminations, alkyl groups, quarternary ammonium groups, carbon, silicon, halogens, oxygen, hydrogen, nitrogen, sulfur, and phosphorus" as recited in Claim 1 would not provide such specific binding to target nucleic acid. Therefore, there is no motivation to modify Thorp with the electrophilic or nucleophilic functional groups as recited in Claim 1 as amended, and Thorp clearly does not teach or suggest all the claim limitations.

Accordingly, Applicants request that the rejection under 35 U.S.C. § 102 of Claim 1 and Claims 2-20 depending therefrom be withdrawn. Applicants note that no prior art rejections have been made against Claims 44-54.

III. Conclusion

In light of the above amendments and remarks, Applicants respectfully submit that the application is in condition for allowance and respectfully requests same. The Examiner is requested to contact the undersigned to resolve any remaining issues.

Respectfully submitted,



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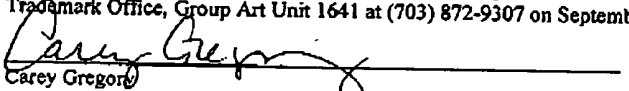

Carey Gregory
Date of Signature: September 10, 2002

VERSION WITH MARKINGS TO SHOW CHANGES MADE

The following is an addendum to the concurrently filed Amendment in response to the Official Action dated November 15, 2001 in the above-referenced application. This addendum includes a marked-up version of the changes made to the specification and claims by the present Amendment.

In the claims:

Please amend the claims as follows:

1. (Twice Amended) A substrate comprising [for use in the adsorption and non-adsorption of biomolecules and having] a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon, titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium and yttrium; (2) M, O, H, and N wherein M is defined above, (3) C; (4) O, C, H, and N; and (5) M or C, and one of O, H, or N, wherein the chemically crosslinked material is terminated with the at least one electrophilic or nucleophilic functional group;

the electrophilic or nucleophilc functional group selected from the group consisting of hydrogen-termination, alkyl groups, quarternary ammonium groups, carbon, silicon, halogens, oxygen, hydrogen, nitrogen, sulfur and phosphorus.

44. (Amended) A substrate comprising [for use in the adsorption and non-adsorption of biomolecules having] a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon, titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium, and yttrium; (2) M, O, H, and N wherein M is defined above; and (3) O, C, H, a and N and wherein the chemically crosslinked material is terminated with the at least one electrophilic or nucleophilic functional group.

45. (Amended) A substrate comprising [for use in the adsorption and non-adsorption of biomolecules having] a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon, titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium, and yttrium; (2) M, O, H, and N wherein M is defined above; (3) O, C, H, a and N; and (4) M or C, and one of O, H, or N; and wherein the chemically crosslinked material is terminated with the at least one electrophilic or nucleophilic functional group.

46. (Amended) A substrate comprising [for use in the adsorption and non-adsorption of biomolecules having] a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising a chemically crosslinked material comprising Si, C, and H deposited in a PECVD process with a tetra methyl silane ($Si(CH_3)_4$) precursor and wherein the chemically crosslinked material is terminated with the at least one electrophilic or nucleophilic functional group.

47. (Amended) A substrate comprising [for use in the adsorption and non-adsorption of biomolecules and having] a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon, titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium and yttrium; (2) M, O, H, and N wherein M is defined above, (3) C; (4) O, C, H, and N; and (5) M or C, and one of O, H, or N, wherein the chemically crosslinked material is terminated with the at least one electrophilic or nucleophilic functional group and wherein the at least one electrophilic or nucleophilic functional group is deposited by a plasma treatment.

48. (Amended) A substrate comprising [for us in the adsorption and non-adsorption of biomolecules and having] a surface with at least one electrophilic or

nucleophilic functional group attached thereto, said substrat having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon, titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium and yttrium; (2) M, O, H, and N wherein M is defined above, (3) C; (4) O, C, H, and N; and (5) M or C, and one of O, H, or N, wherein the chemically crosslinked material is terminated with the at least one electrophilic functional group for electrostatically attracting positively charged molecules for adsorption and electrostatically repelling negatively charged molecules for non-adsorption.

49. (Amended) A substrate comprising [for use in the adsorption and non-adsorption of biomolecules and having] a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon, titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium and yttrium; (2) M, O, H, and N wherein M is defined above, (3) C; (4) O, C, H, and N; and (5) M or C, and one of O, H, or N, wherein the chemically crosslinked material is terminated with the at least one nucleophilic functional group for electrostatically attracting negatively charged molecules for adsorption and electrostatically repelling positively charged molecules for nonadsorption.

50. (Amended) A substrate comprising [for use in the adsorption and non-adsorption of biomolecules and having] a surface with at least one electrophilic or nucleophilic functional group attached thereto, said substrate having a coating positioned thereon, the coating comprising an amorphous chemically crosslinked material comprising elements selected from the group consisting of (1) M, O, C, H, and N; wherein M is a metal selected from the group consisting of silicon, titanium, tantalum, germanium, boron, zirconium, aluminum, hafnium and yttrium; (2) M, O, H, and N wherein M is defined above, (3) C; (4) O, C, H, and N; and (5) M or C, and

one of O, H, or N, wherein the chemically crosslinked material is terminated with the at least one nucleophilic functional group.